

the compression elements. In re Echard, 176 USPQ 321 (CCPA 1973) (holding that "there is nothing inherently wrong in defining something by what it does rather than by what it is.") In the Echard case, the limitations approved by the court were "having sufficient flexibility and width strength to permit . . ." and "having sufficient adhesive characteristics to firmly bond . . ." The word "effective" was also approved by the CCPA under the same reasoning in the case of In re Caldwell, 319 F.2d 254, 138 USPQ 243 (CCPA 1963).

The Section 103 Rejections

Claims 1-4 were rejected on a new ground of rejection, namely Clarke '936 in view of Miller '851. It is respectfully submitted that, for the following reasons, applicant's athletic shoe as defined in amended claim 1 is not obvious over Clarke in view of Miller.

Clarke provides an athletic shoe having a sole comprised of a midsole 14 and an outer sole 100. As explained in col. 4, lines 33-41 of the patent, the midsole is of a resilient cushioning material such as EVA, foam polyurethane or an encapsulated air cushion, while the outer sole is made of a "hard resilient and flexible wear-resistant material such as rubber or a comparable synthetic material." Outer sole 100 is characterized in having a plurality of traction elements which comprise polygonal shaped cleats 112-118 located in the heel, arch and forefoot sections, and wear plugs 122 in heel section 104. As explained at col. 5, lines 4-6, the wear plugs serve to "provide a large ground contact surface at a point of high wear, i.e. at the heel." The wear plugs 122 are separated into medial and lateral wear plugs by a shallow gap 136 which extends a short distance to a base 102, which is a part of the outsole. As shown in Fig. 2 the gap 136 does not extend through the outsole into the midsole because the upper surface of the gap

is coextensive with the lower surface of base 102 (Fig. 8). In other words Clarke's midsole is solid throughout and not penetrated by the gap.

As a result, Clarke's solid midsole with only the outsole having a shallow gap at the heel portion is similar to the type of athletic shoe which was acknowledged as prior art and shown at 10 in Fig. 1 of applicant's drawing. Clarke's shoe would suffer from the same disadvantages described for such a shoe design in the paragraph beginning at page 6, line 6 of applicant's specification.

The accompanying Declaration of Stan Hockerson explains the results of forces that would act on a shoe constructed in accordance with the Clarke patent during and following the heel strike phase and compares them with the results of comparable forces acting on a shoe that is made in accordance with amended claim 1 of the present invention. Exhibit 3 (Fig. A) of the declaration is a rear view sketch of an athletic shoe in accordance with Clarke immediately following heel strike while Fig. B is a comparable rear view sketch of an athletic shoe made in accordance with the present invention and shown during the same phase of the gait cycle. Exhibit 4 (Fig. C) is a sketch of a cross section of a right shoe corresponding to Fig. 8 (which is a left shoe) of the Clarke patent demonstrating the effect of the forces on the midsole material during the heel strike phase. Exhibit 4 (Fig. D) is a sketch showing the cross section along the heel portion of applicant's shoe of Fig. B illustrating the effect of the forces on the midsole material during the heel strike phase.

As explained in the Hockerson declaration ¶8 the midsole of the Clarke shoe, being a solid slab of resilient material, during the heel strike phase results in the downward impact forces at 17 causing the lateral side of the midsole material to compact and bulge outwardly at 18. This pulls the midsole material to the lateral side as shown by the arrow

16, and this in turn pulls the medial portion of the midsole to the lateral side as shown by the arrow 16'. The medial side of the shoe is thereby pulled downwardly as shown by the arrow 16". The shallow groove 136 which is cut solely through the outer sole of Clarke has no effect in stopping the lateral pull of the midsole material at 16 and 16', and thus has no effect on stopping the downward pull on the medial side of the shoe at 16". (Hockerson Dec. ¶9). This downward pull is objectionable because it causes the medial side of the sole to move down at a faster rate than the optimum, which would be the rate for a barefoot runner. (Exhibit 2 of Hockerson Dec.).

In addition, the Clarke shoe is a cantilever type having outsole cleats 112, 114 on both the lateral and medial edges of the outsole base. The result from this type of cantilever structure is demonstrated in Hockerson Dec. Exhibit 4 (Fig. C) where, for the right shoe, the outsole base at the heel portion has a lateral traction cleat 114 and a medial cleat 114'. As shown in Clarke's Fig. 2 there are no traction cleats in the area between those on the lateral and medial cleats on the edges of the outsole. Clarke describes this as the area 124 comprising a "rear shock attenuating area." Clarke explains at col. 5, lines 42-50, that the shock attenuating area, during foot strike, depresses slightly on the dot-dash line 113 in Fig. 8. Clarke further explains that this spreads the force of impact which is transmitted to the foot over a slightly greater period of time, and that the delay in action attenuates or reduces the severity of the force of foot strike. However, this also has the undesirable effect of causing the outsole to react like a cantilever. The result is that the downward motion on the medial side of the shoe is increased over that of a non-cantilever running shoe (Hockerson Dec. ¶10; Exhibit 3, Fig. A).

Clarke also explains at col. 6, lines 31-34, that the reinforcing wedges defined by

the sidewalls 140 (Fig. 2) provide a more secure connection between the cleats and wear plugs and base 102. These reinforcing wedges, which incline from the wear plugs inwardly toward the shock attenuating area 124, would create transverse pulling forces on the inner portion of the outsole as either wear plug is compressed upon heel contact. In other words, the wedges would increase the lateral pulling action described in connection with Exhibit 1 of the Hockerson declaration. This would have a contrary result from that of applicant's invention as shown in Exhibit 4. Such a contrary teaching from the Clarke patent itself constitutes evidence that applicant's invention is unobvious, as was held in the leading Supreme Court case of United States v. Adams, 383 US 39, 15 L.Ed.2d 572 (1966).

The distinction in heel-strike acceleration motion of applicant's invention from an athletic shoe designed as in Clarke is explained graphically in the chart of applicant's Fig. 6.¹ In that chart line 60 plots the time from heel strike to loading phase for prior art athletic shoes while the line 62 plots the comparable time for shoes incorporating the present invention. The two lines show that the time from heel strike to loading phase for applicant's invention is longer, meaning that the heel portion accelerates less than the conventional shoes. (Hockerson Dec. ¶11).

Exhibit 2 of the Hockerson declaration is a bar graph which compares the average speed from heel strike to loading phase for the three traces on Fig. 6 that represent barefoot runners, runners wearing conventional athletic training shoes and those wearing shoes modified in accordance with applicant's invention.

¹ The motion analysis treadmill machine recordings of the elapsed time from heel strike to loading phase for 45 different runners that resulted in the Fig. 6 chart are contained in Exhibit 1 of the Hockerson declaration.

The remarkable improvement from modifying the different types of conventional athletic shoes (among them were shoes made by Avia, Reebok, New Balance and Nike) by cutting longitudinal channels up through the heel in accordance with applicant's invention is shown by the bar chart of Exhibit 2 (Hockerson Dec.). In that chart the "Misc. Training Shoes" bar is shorter (meaning that elapsed time to the loading phase is less so that pronatory acceleration is greater) than the "Independent Suspension" bar which represents results from the shoes modified in accordance with applicant's invention. The Independent Suspension bar is much closer to the optimal "Barefoot" bar.

The Miller patent was cited as showing a lasting board with the comment that it would be obvious to incorporate such a lasting board into the Clarke shoe. However, Miller specifically states that the lasting board is made of rubber and is provided with a series of horizontal slot-like openings which cooperate with grooves in the midsole to permit water to run out the sides of the shoe (col. 2, lines 12-20). Such a rubber lasting board is not known to be incorporated into athletic shoes of the type to which the present invention relate (Hockerson Dec. ¶12). In any event, Miller does not disclose or suggest the limitations of the amended claim in which a channel divides the heel portion of an athletic shoe outsole and midsole into laterally adjacent compression elements and in which the channel extends upwardly through the sole with a vertical height that is effective to prevent an insubstantial transfer of motion between the compression elements.

The foregoing distinctions between applicant's invention and the prior art, including Clarke and Miller, are set forth in amended claim 1. The claim has been amended to provide that the channel extends upwardly through the sole and is separated from the upper by a connecting portion of the sole which has a vertical height that is effective to

present an insubstantial transfer of motion between the compression elements responsive to stress forces. Comparable language was in previous claim 3, now canceled. Claim 1 now clearly distinguishes over Clarke in view of Miller because, first, in Clarke the gap 136 is between the two wear plugs only in the outsole and does not extend upwardly into any part of the midsole; second, the cantilever type construction of Clarke's outsole would undesirably cause an increase in the downward pulling motion on the medial side during the heel strike phase, a reaction that is the exact opposite of applicant's invention; and thirdly, Miller contains no suggestion of providing a longitudinal slot for dividing the midsole of the heel portion into a pair of laterally adjacent compression elements.

Accordingly, in view of the foregoing it is submitted that applicant's amended claim 1, together with dependent claims 2 and 4, present patentable subject matter over the art of record. Reconsideration and allowance of these claims is respectfully solicited. Should the Examiner have any questions on the foregoing, a telephone call to Applicant's attorney at (415) 781-1989 is invited.

Respectfully submitted,

Date: 7/27/96

RE Backus
Richard E. Backus
Reg. No. 22,701

FLEHR, HOHBACH, TEST
ALBRITTON & HERBERT
Four Embarcadero Center, Suite 3400
San Francisco, CA 94111
(415) 781-1989